In[70]:=
```
TObj[A_, B_, IA_] := Module[{M1, m, n, M, b, i, j, S},
m = Dimensions[A][[1]]; n = Dimensions[A][[2]];
M1 = Table[0, m, n];
S = M1;
M = Table[0, m + n - 1, m + n];
b = Table[0, m + n - 1];
For[i = 1, i ≤ m + n - 1, i++, M[[i, B[[i, 1]]]] = 1;
    M[[i, m + B[[i, 2]]]] = 1;
    b[[i]] = Extract[A, B[[i]]]; (*A[[B[[i]][[1]],B[[i]][[2]]]*)];
V = LinearSolve[M, b];
For[i = 1, i ≤ m, i++,
For[j = 1, j ≤ n, j++,
If[MemberQ[B, {i, j}], M1[[i, j]] = bp;
      S[[i, j]] = IA[[Flatten[Position[B, {i, j}]][[1]]]],
M1[[i, j]] = V[[i]] + V[[m + j]] - A[[i, j]];
]
]
];
{M1 // MatrixForm, S // MatrixForm}]



TPivot[Lp_, Bp_, Ia_, Mv_] := Module[{ll, lpp, elia, pma, ma, Bp2, Ia2, Tc},
ll = Length[Lp];
lpp = Flatten[Table[Position[Bp, Lp[[i]]], {i, 2, Length[Lp]}]]; (*Position in of LP(i) in BP*)
elia = Table[Ia[[ lpp[[2 i - 1]] ]], {i, 1, ll / 2}];
  (*removing the entering var, extract the odd position amount*)
pma = PositionSmallest[elia][[1]];
  (*find the position of smallest amount which is the departing var*)
ma = Min[elia]; (*the smallest amount*)
Bp2 = ReplaceAll[Bp, Lp[[2 * pma]] → Lp[[1]] ;
  (*replacing the even departing position by the entering position*)
lpp = Join[lpp, Position[Bp, Lp[[2 * pma]]][[1]]];
Ia2 = Ia;
For[i = 1, i ≤ ll / 2, i++,
Ia2[[lpp[[2 i - 1]]]] = Ia[[lpp[[2 i - 1]]]] - ma;
Ia2[[lpp[[2 i]]]] = Ia2[[lpp[[2 i]]]] + ma;
];
Tc = Sum[Extract[Mv, Bp2[[i]]] * Ia2[[i]], {i, 1, Length[Ia2]}];
{Bp2, Ia2, Tc}
]
```

In[72]:=
```
CM = {{9, 3, 6, 7, 3}, {7, 5, 2, 10, 6}, {5, 4, 9, 8, 10}};
T1a = {{{1, 2}, {1, 5}, {2, 1}, {2, 3}, {2, 5}, {3, 1}, {3, 4}},
{60, 40, 50, 80, 30, 40, 100}};
T1 = Join[T1a, {Sum[Extract[CM, T1a[[1]][[i]]] * T1a[[2]][[i]], {i, 1, Length[T1a[[2]]}]}]
TObj[CM, T1[[1]], T1[[2]]]
```

Out[74]=
```
{{{1, 2}, {1, 5}, {2, 1}, {2, 3}, {2, 5}, {3, 1}, {3, 4}}, {60, 40, 50, 80, 30, 40, 100}, 1990}
```

Out[75]=
$$\left\{\begin{pmatrix} -5 & \text{bp} & -7 & 0 & \text{bp} \\ \text{bp} & 1 & \text{bp} & 0 & \text{bp} \\ \text{bp} & 0 & -9 & \text{bp} & -6 \end{pmatrix}, \begin{pmatrix} 0 & 60 & 0 & 0 & 40 \\ 50 & 0 & 80 & 0 & 30 \\ 40 & 0 & 0 & 100 & 0 \end{pmatrix}\right\}$$

In[76]:=
```
T2 = TPivot[{{2, 2}, {2, 5}, {1, 5}, {1, 2}}, T1[[1]], T1[[2]], CM]
TObj[CM, T2[[1]], T2[[2]]]
```

Out[76]=
```
{{{1, 2}, {1, 5}, {2, 1}, {2, 3}, {2, 2}, {3, 1}, {3, 4}}, {30, 70, 50, 80, 30, 40, 100}, 1960}
```

Out[77]=
$$\left\{\begin{pmatrix} -4 & \text{bp} & -6 & 1 & \text{bp} \\ \text{bp} & \text{bp} & \text{bp} & 0 & -1 \\ \text{bp} & -1 & -9 & \text{bp} & -7 \end{pmatrix}, \begin{pmatrix} 0 & 30 & 0 & 0 & 70 \\ 50 & 30 & 80 & 0 & 0 \\ 40 & 0 & 0 & 100 & 0 \end{pmatrix}\right\}$$

In[78]:=
```
T3 = TPivot[{{1, 4}, {1, 2}, {2, 2}, {2, 1}, {3, 1}, {3, 4}}, T2[[1]], T2[[2]], CM]
TObj[CM, T3[[1]], T3[[2]]]
```

Out[78]=
```
{{{1, 4}, {1, 5}, {2, 1}, {2, 3}, {2, 2}, {3, 1}, {3, 4}}, {30, 70, 20, 80, 60, 70, 70}, 1930}
```

Out[79]=
$$\left\{\begin{pmatrix} -5 & -1 & -7 & \text{bp} & \text{bp} \\ \text{bp} & \text{bp} & \text{bp} & 0 & 0 \\ \text{bp} & -1 & -9 & \text{bp} & -6 \end{pmatrix}, \begin{pmatrix} 0 & 0 & 0 & 30 & 70 \\ 20 & 60 & 80 & 0 & 0 \\ 70 & 0 & 0 & 70 & 0 \end{pmatrix}\right\}$$